WARWICK
THE UNIVERSITY OF WARWICK

SINFONIA

Sugammadex for preventIoN oF pOst-operative pulmoNary complIcAtions

Sugammadex for prevention of post-operative pulmonary complications (SINFONIA)

STATISTICAL ANALYSIS PLAN

Sponsor (Ref)	Belfast Health and Social Care Trust (22005JS-AS)
ISRCTN:	15109717
Funding Body:	National Institute for Health Research Health Technology Assessment
Ethics Approval:	22/EM/0231-East Midlands-Nottingham 2 REC, 12th Jan 2023
MHRA Approval: *(if applicable)*	CTA 32485/0041/001-0001, 20th Dec 2022
SAP Version:	1.0
Date:	15/04/2026
Stage:	Final
Protocol version:	V6.0, dated 30th April 2025

WARWICK CLINICAL TRIALS UNIT

HSC Belfast Health and Social Care Trust
caring supporting improving together

QUEEN'S UNIVERSITY BELFAST

FUNDED BY NIHR | National Institute for Health and Care Research

Contents

1 Administrative Information

1.1 SAP revision history

SAP Version	Protocol Version	Date and timing of revision	Details of revision
V0.1	6.0	13/05/2025	First SAP draft
V0.2	6.0	22/05/2025	Updated first SAP draft after clinical review
V0.3	6.0	15/04/2026	Updated SAP draft after DMC/TSC comments

1.2 Administrative details

The study will be analysed with regard to Good Clinical Practice and as laid out in WCTU SOPs. The electronic Trial Master File can be found at: [redacted]. This includes the most recent version of the Data Management plan, which gives details of data collection methods.

The Statistical Master File can be found at: [redacted]. All sensitive and confidential material is encrypted and access is limited to the Trial Statistician(s) and their nominated access back up (see: [redacted] for user details).

1.3 Roles, responsibilities and approvals

Role	Name and contact details	Date	Signature
Author of SAP	Miss Katie Booth, Research Fellow, Warwick Clinical Trials Unit (WCTU), University of Warwick	6th May 2026	[redacted]
Senior statistician	Dr Louise Hiller, Associate Professor in Medical Statistics Warwick Clinical Trials Unit (WCTU), University of Warwick	7th May 2026	[redacted]
Chief Investigator	Dr Jon Silversides, Clinical Senior Lecturer in Critical Care, Queen's University Belfast Consultant, Belfast Health and Social Care Trust	6th May 2026	[redacted]
Independent statistician	[redacted]	6th May 2026	[redacted]

2 Aims and Design of the Trial

2.1 Background and rationale

Improving recovery from surgery and preventing post-operative pulmonary complications (PPCs) is a public health research priority as defined by patients, carers and clinicians through the James Lind Alliance. There is an urgent need to identify effective methods to reduce the incidence of PPCs. The most important anaesthesia-related risk factor for PPCs is the use (and reversal of) neuromuscular blocking agents (NMBAs) as part of general anaesthesia. Sugammadex reduces the incidence of residual muscle paralysis due to NMBAs compared to neostigmine, but evidence for its clinical effectiveness remains limited. There is a steady increase in its use in the NHS [1]. At present there is equipoise amongst anaesthetists about the risks and benefits of this drug, but this may change given that immediate benefits (faster reversal of NMBA drugs) are readily apparent to anaesthetists while the principal risk (anaphylaxis) may only become evident some years later, on re-exposure. This clinical trial is needed to define the risks and benefits of Sugammadex before further change in NHS practice occurs.

2.2 Aims and objectives

The primary objective of SINFONIA is to determine whether sugammadex is superior to neostigmine after elective or emergency major abdominal or non-cardiac thoracic surgery in terms of days alive and out of hospital at 30 days (DAH30). The secondary objectives are (a) To determine whether sugammadex is superior to neostigmine in terms of prevention of PPCs, mortality and other patient-centred outcomes after elective or emergency major abdominal or non-cardiac thoracic surgery, (b) To determine the cost effectiveness of sugammadex compared with neostigmine and (c) To estimate the rate of allergic sensitisation after a single exposure to Sugammadex.

2.3 Trial design

SINFONIA is a multi-centre pragmatic randomised trial comparing the clinical and cost effectiveness of two agents for reversal of neuromuscular blockade at the end of anaesthesia for major surgery, sugammadex and neostigmine, with a primary outcome of days alive and out of hospital at 30 days (DAH30). The trial will take place in approximately 40 NHS hospital sites (allergic sensitisation sub-study to take place in approximately five of these sites). Potentially eligible participants will be identified through surgical and joint multidisciplinary meetings, pre-operative assessment clinics and/or operating theatre lists at participating hospitals. A full list of participating sites will be available in the Trial Master File.

2.4 Randomisation

Participants will be randomised on a 1:1 basis to receive either sugammadex or neostigmine. Randomisation will be undertaken through a simple and secure web-based or IVRS randomisation system that has been established by the programming team at Warwick Clinical Trials Unit. This computerised procedure will use a minimisation algorithm to ensure balance in treatment arm allocation across the following stratification variables - factors thought to affect outcome either through treatment effectiveness or underlying prognosis - also permitting appropriate exploratory subgroup analyses:

1. Trial hospital site
2. Emergency vs elective surgery
3. Thoracic vs abdominal surgery

The inclusion of hospital site within this list of factors allows for some instances of predictability of the next treatment allocation. To eliminate this, each patient will have a probability (unspecified here) of being randomised to the opposite trial arm that they would have otherwise received. Full details of the minimisation algorithm will be stored in a confidential document at WCTU. If the web-based or IVRS enrolment/randomisation system is unavailable for technical reasons, an emergency enrolment/randomisation system will be provided by WCTU Monday – Friday, 9am – 5pm. The emergency enrolment/randomisation telephone number will be provided to sites in the Investigator Site Files.

Randomisation should be undertaken after induction of anaesthesia where possible, although this is not mandatory. However, it is mandatory that randomisation is completed before neostigmine, sugammadex or any neuromuscular blockade reversal drug is administered.

2.5 Sample size

We will recruit 2500 participants in total (1250 per trial arm). Based on data from the Secure Anonymised Information Linkage (SAIL) databank in Wales, we expect participants in the neostigmine arm to experience an average DAH30 of 22.4 days (SD 7.4). Assuming a standard deviation of 7.5, with 5% two-sided significance level and 90% power, the randomisation of 2500 participants will allow detection of a one-day difference in DAH30 between trial arms, whilst allowing for 5% loss to follow up. This sample size will also allow us to detect a 3% absolute difference in the incidence of PPCs between trial arms with at least 85% power and 5% two-sided significance, assuming a PPC rate of approximately 7%.

2.6 Blinding

The clinical team will not be blinded to the Investigational Medicinal Product (IMP) administered, and this will be recorded in the clinical notes, so there will be no specific unblinding procedure. Care will be taken not to inform participants of treatment group assignment, except where necessary for patient safety (e.g. allergic reaction). Research delivery staff assessing participant outcomes will be masked to treatment group assignment wherever possible. However, complete blinding of all clinicians and research staff is not feasible. In an aim to minimise detection bias, PPCs will be confirmed by a member of the clinical or research team who does not have knowledge of treatment allocation, but this may not always be possible. Complete blinding of the trial management team and statisticians is also not feasible.

2.7 Timing of final analysis

The main trial analysis will be undertaken when 2500 participants have been randomised, the last participant has completed the final follow-up visit (180 days), the data cleaning is complete, and the database is locked.

2.8 Timing of outcome assessments

Table 1: Timing of outcome assessments

Visit	0	1	2	3	4	5	6
Visit window	Baseline (pre-op)	Day 0 (surgery)	Day 1	Day 7	Day 30	6 weeks to 6 months	180 days
Screening using inclusion / exclusion criteria	X						
Informed consent	X						
Enrolment	X						
Baseline data	X						
Randomisation		X					
Intervention		X					
PPCs				X*			
Duration of hospital stay					X		
Duration of ICU stay (if applicable)					X		
Survival status					X		X+
Hospital readmission					X		
Health resource use					X#		X
Quality of recovery (QoR-15)			X				
Health-related quality of life (EQ-5D-5L)	X			X#	X#		X^
Skin testing for allergic sensitisation sub-study~						X	
Blood sampling (allergic sensitisation sub-study~		X				X	
Blood sample collection (biological sampling sub-study)¶	X		X#				

*Or until hospital discharge if sooner. #Or as close as possible. ^+/- 28 days.

~Allergic sensitisation sub study participants only.

¶ *Biological sampling sub-study patients only. Baseline sampling at any point between consent and surgical incision.*

+ Survival check will also be done prior to the dissemination of trial results at the end of trial.

3 Monitoring of the Trial

3.1 Screening data

Details of patients who are potentially eligible for the trial, but subsequently not recruited, will be recorded (including reason not recruited, but without any personal identifiers) on the electronic patient-screening log provided to sites in the Investigator Site File.

3.2 Eligibility

Patients are eligible to be included in the trial if they meet the following criteria:

Inclusion criteria

1. Patients presenting for elective or emergency major abdominal or non-cardiac thoracic surgery
2. Age ≥ 50 years
3. Planned use of rocuronium or vecuronium for neuromuscular blockade
4. Planned reversal of neuromuscular blockade at the end of surgery

Exclusion criteria

1. Known allergy to sugammadex, neostigmine or glycopyrrolate
2. Lack of written informed consent for trial participation
3. Planned invasive mechanical ventilation before or after surgery
4. Previous participation in SINFONIA trial
5. Clinician refusal (with reason)

3.3 Recruitment

A Consolidated Standards of Reporting Trials (CONSORT) flow diagram will be produced, showing the frequency of participants:

- Assessed for eligibility
- Excluded prior to randomisation (and the frequency of each reason for exclusion)
- Randomised
- Allocated to each randomisation arm
- Receiving or not receiving their randomised treatment
- Followed-up at each protocol specified timepoints
- Lost to follow-up at each protocol specified timepoints (and the frequency of each reason for loss to follow-up)

3.4 Withdrawal/follow-up

The counts and percentages of the various levels of withdrawal will be presented (e.g. from treatment and/or from further data collection), along with the reasons and frequencies of all withdrawals and lost-to-follow ups at the various follow-up time points. Numbers will be reported within the CONSORT flow diagram, with additional tabulated exploration of reasons, if necessary.

3.5 Baseline patient characteristics

Descriptive statistics will be used to summarise the distribution of baseline variables across each of the randomisation arms. Characteristics will include age at randomisation (</≥ 50 years), biological sex (male/female), ethnicity, type of surgery (emergency/elective), location of surgery (non-cardiac thoracic/abdominal), Rockwood frailty score, co-morbidities and SARS CoV2 status. Patient characteristics will be presented for all randomised patients.

3.6 Adherence and protocol deviations

Non-compliance is defined as failure to administer the assigned treatment within the specified dose range in the absence of acceptable justification (see below for definitions). Acceptable justifications may include neuromuscular monitoring, or dose adjustment for obese patients based on local / national guidelines. Justifications will be reviewed by the TMG who will determine acceptability and non-compliance reporting.

Sugammadex: Participants randomised to the sugammadex arm should receive an intravenous bolus of sugammadex (2-4mg/kg) for reversal of neuromuscular blockade around the end of the surgery. Within these parameters, the precise dose and timing are left to the discretion of the treating anaesthetist. If deemed necessary by the treating anaesthetist, patients allocated to the sugammadex treatment group may be administered a second dose of sugammadex. The maximum total dose of sugammadex (whether one or two doses are used) should not exceed 8mg/kg. A third or subsequent dose of sugammadex, or any dose of neostigmine administered, will be outside the trial intervention and will constitute a protocol deviation for monitoring purposes. If the dose of sugammadex administered is outside the specified range, reasons for this will be collected.

Neostigmine: Participants randomised to the neostigmine arm should receive an intravenous bolus of neostigmine (30-70 mcg/kg) for reversal of neuromuscular blockade around the end of surgery, with co-administration of glycopyrrolate at an appropriate dose to prevent muscarinic side effects (for example 200mcg per 1mg of neostigmine). The precise dose and timing are left to the discretion of the treating anaesthetist. If deemed necessary by the treating anaesthetist, patients allocated to the neostigmine treatment group may be administered a second dose. The maximum total dose of neostigmine (whether one or two doses are used) should not exceed 5mg neostigmine or 70mcg/kg, whichever is less. A third or subsequent dose of neostigmine, or any dose of sugammadex administered, will be outside the trial intervention and will constitute a protocol deviation for monitoring purposes. If the dose of neostigmine administered is outside the specified range, reasons for this will be collected.

Non-compliances will be monitored throughout the trial during TMGs and DMCs by monitoring frequencies of non-compliances by site.

Counts and percentages of patients on each trial arm who did not have their randomised treatment adhered to will be presented. The trial case report forms will record any protocol deviations and violations, and appropriate corrective and preventative actions taken. Counts and percentages of all reported deviations and violations will be presented. Exploration of magnitude of dose deviation and reasons for non-adherence will also be presented by group.

3.7 Safety data and harms

This trial has been classified as a Type A CTIMP as the potential risk is no higher than that of standard care. The outcome measures in this trial focusing on patient safety are Allergic reaction within 24 hours after administration of IMP. PPCs within seven days after surgery will be reviewed/monitored at intervals by the DMC.

Frequencies of Serious Adverse Events (SAE) will be reported by event type, causality and outcome. Frequencies of symptoms associated with the SAEs will also be reported. No additional adverse event details will be collected. PPCs will be included as part of the safety analysis of the trial.

3.8 Assessment of bias

Baseline characteristic data, including stratification variables, will be assessed across arms to ensure the randomisation is working correctly, and loss to follow-up rates will be investigated to ensure equal prevalence across patient groups.

3.9 Statistical interim analyses and stopping guidance

No formal interim analyses have been planned for this trial. The trial will be stopped prematurely if:

- Mandated by the Research Ethics Committee (REC)
- Following recommendations from the Data Monitoring Committee (DMC) and Trial Steering Committee (TSC) or Sponsor
- Funding for the trial ceases

Where DMC/TSC recommend stopping recruitment only, where possible, follow up data will be collected and cleaned before database lock.

4 Clinical Outcomes and Analysis Data

4.1 Primary outcome (DAH30)

The primary endpoint of this trial is number of days alive and out of hospital at 30 days after surgery (DAH30)[2]. DAH30 is a continuous number between 0 and 30 which reflects, out of the 30 days following surgery, the total number of those days that a participant spends alive and at home. In this definition, home reflects any place other than hospital. This sensitive measure reflects the number of days from surgery to discharge, and any hospital readmission(s) during that month as well as survival. If a participant dies within those 30 days, their value is set to 0. For calculation of DAH30, days in hospital will be calculated by taking one date from the other, i.e. not using full days. For example, if a participant was admitted on a Monday and discharged on the Wednesday, this would count as 2 days in hospital. Similarly, if a participant is readmitted and discharged in the same day, this would count as 0 days in hospital.

4.2 Secondary outcomes

Table 2: Secondary outcome definitions

Secondary outcomes	Details
Clinical effectiveness	
Post-operative Pulmonary complications (PPCs) within seven days after surgery	Collected at day-7 post-op. Participant is classed as having a PPC if at least one of the following has occurred (using Step-COMPAC definition) [3]: - Atelectasis, - Pneumonia, - Acute respiratory distress syndrome (ARDS), - Pulmonary aspiration
Mortality at 30 and 180 days after surgery	Mortality is collected at day 7 post-op, day 30 post-op, day 180 post-op and via notification of death form. All data items will be used to determine mortality at 30 and 180 days after surgery.
Quality of recovery on the first post-operative day (QoR-15).	Assessed using QoR-15 questionnaire at day 1-post op. A 15-question instrument, each scored 0-10, with a total score created as the sum of all questions, and with a prorated score calculated as long as at least 13 questions are answered[Error! Reference source not found.]. If 1 or 2 values are missing, the missing values will be imputed using the mean across the other items. If more than 2 items are missing, the questionnaire will be excluded from the analysis.
Health-related quality of life at 7, 30 and 180 days (EQ-5D-5L)	EQ-5D-5L is a 5-level questionnaire where scores range from <0-1, with a higher score indicating a better quality of life. For scoring, mapping to the 3L version will be done to calculate the score, for example using the Stata command 'eq5dmap'[Error! Reference source not found.].
Safety	
Allergic reaction within 24 hours after administration of IMP	Collected at day 1 post-op. Yes/No outcome.
Other	
Rate of allergic sensitisation to sugammadex (in patients enrolled in the allergic sensitisation sub-study)	The incidence of clinically relevant allergic sensitisation to sugammadex will be determined by an adjudication panel and the verdict will be collected as an outcome in the sub-study CRF. The rate will be calculated across both study arms.

5 Main Statistical Analyses and Estimand Framework

5.1 Statistical Principles

For both patient descriptors and trial endpoints, continuous variables will be reported with means and 95% confidence intervals, if normally distributed, or medians and Interquartile Ranges (IQR) otherwise. Categorical variables will be reported using frequencies and percentages. For the main superiority hypothesis testing, all primary and secondary endpoint analyses will be undertaken using 5% two-sided significance levels, with no planned adjustment for multiplicity.

5.2 Analysis of primary outcome: DAH30

5.2.1 Primary analysis (ITT)

Participants will be analysed using intention to treat (i.e., according to their randomised treatment allocation, not what they received). Patients not receiving surgery, due to cancellations, withdrawing consent for follow-up prior to surgery, or dying prior to surgery, will not be included in the analysis or relevant denominators (Table 4).

For the primary outcome of DAH30, each randomised treatment arm's appropriate point estimate and measure of variation, as determined by the distribution of the data will be reported and graphically presented. In addition, DAH30 will be compared across randomised treatment arms using regression techniques appropriate for count data. The specific model will be selected after examining the data distributions and assessing for under – or over – dispersion, but is anticipated to be either a zero-inflated Poisson or zero-inflated negative binomial regression model. The model will be adjusted by the minimisation variables; trial hospital site, type of surgery (emergency/elective) and location of surgery (thoracic/abdominal).

5.2.2 Sensitivity analyses

After investigation into the degree of cross-over recorded between the randomised interventions, a secondary per-protocol analysis (PPA) may also be undertaken for sensitivity purposes, including only patients who received their randomised intervention (Table 4).

This would comprise of two sensitivity analyses:

- **PPA 1**: including participants who received their allocated treatment only (regardless of dosage),
- **PPA 2:** including participants who received their allocated treatment only *and* the correct dosage of that treatment.

If at the univariate level extra baseline variables are found to be predictive of treatment effect, these may also be included within the adjusted model.

5.2.3 Intercurrent events and Estimand framework of primary outcome analyses

Table 3: Intercurrent events (ICE) relating to the intervention

ICE 1	**Crossovers:** Participants receiving the incorrect treatment allocation (i.e. receiving sugammadex when randomised to neostigmine), either alongside the correct treatment, or instead of.
ICE 2	**Wrong dose of the correct treatment:** At least one of the following: - Receiving under the minimum or over the maximum allowed dose for the *first dose* of the allocated treatment, - Receiving over the maximum dose of the *total* given allocated treatment (i.e. dose 1 + 2), - Receiving a third dose of the allocated treatment. See Section 3.6 for full definition of correct doses.
ICE 3	**No reversal agent given:** Participants do not receive sugammadex **or** neostigmine.
ICE 4	**Surgery cancelled after randomisation:** Applies to both treatment groups.
ICE 5	**Withdrawals/Deaths** prior to surgery**:** Participant withdraws/dies prior to surgery

Table 4: Estimand framework for analyses of the primary outcome

Attribute	**Definition**
Objective	To determine whether sugammadex is superior to neostigmine after elective or emergency major abdominal or non-cardiac thoracic surgery.
Population	Patients ≥ 50 years old presenting for elective or emergency major abdominal or non-cardiac thoracic surgery
Treatment conditions	Treatment group: sugammadex Usual care group: neostigmine
Endpoint	Number of days alive and out of hospital at 30 days (DAH30).
Summary measure	Incidence rate ratio (IRR) (if appropriate)
Handling of intercurrent events	**Primary analysis (ITT):** ICE 1-3 – Treatment policy. Use outcome regardless of ICE. ICE 4-5 – Principal Stratum. Participants not included if ICE occurred, as no 'Day 0' to calculate DAH30. **PPA 1:** ICE 1, 3-5 – Principal Stratum. Participants not included if ICE occurred. ICE 2 – Treatment policy. Use outcome regardless of ICE. If participant also has ICE 1, ignore ICE 2 and remove them from analysis. **PPA 2:** ICE 1-5 – Principal Stratum. Participants not included if ICE occurred.

5.3 Analysis of secondary outcomes

For all secondary outcomes, participants will be analysed according to their randomised treatment allocation, not what they received. Patients not receiving surgery (i.e. no surgery date to determine post-op dates) or withdrawing consent for follow-up prior to surgery will not be included in relevant denominators.

5.3.1 Post-Operative Pulmonary complications (PPCs)

The overall incidence of a PPC occurring will be assessed across trial arms using chi-squared tests, with additional logistic regression used to adjust for minimisation variables. Additionally, we will repeat the above for each PPC (listed in Table 2) for exploratory purposes.

5.3.2 Mortality at 30 and 180 days after surgery

Mortality rates for both 30 and 180 days after surgery will be assessed across trial arms using chi-squared tests, with additional logistic regression used to adjust for minimisation variables.

5.3.3 Quality of recovery on the first post-operative day (QoR-15)

QoR-15 scores will be assessed across trial arms using t-tests if appropriate, with additional appropriate modelling (such as linear regression) adjusted for minimisation variables.

5.3.4 Health-related quality of life at 7, 30 and 180 days (EQ-5D-5L)

EQ-5D utility scores at day 7, day 30 and day 180 post-op, will be assessed across trial arms using t-tests if appropriate, with additional linear regression to adjust for minimisation variables.

5.3.5 Rate of allergic sensitisation to Sugammadex

The overall incidence of allergic sensitisation will be assessed across trial arms using chi-squared tests, with additional logistic regression used to adjust for minimisation variables. The results of skin testing, mast cell activation testing, and (if performed) a drug provocation test will be presented using descriptive statistics. A comparison of the risks between each trial arm having 0, 1, 2 or 3 positive results from these tests will be explored. The incidence of positive mast cell activation testing to rocuronium will be compared to current estimates of baseline population sensitisation to rocuronium, thought to be between 0.04-0.004% [6,7].

5.4 Subgroup analysis

The two variables used in the minimisation process at randomisation that define sub-groups of interest are:

- Type of surgery (Emergency/Elective)
- Location of surgery (Thoracic/Abdominal)

Additional subgroups of interest include:

- Surgical approach (Open/Minimally invasive)
- Type of Neuromuscular monitoring used (Quantitative/Qualitative/None)

These pre-specified hypothesis-generating sub-group analyses will be undertaken using appropriate modelling techniques with the inclusion of appropriate interaction terms, decided after examination of the distributions of the collected data but expected to be zero-inflated Poisson regression model or zero-inflated negative binomial regression model for DAH30, and logistic regression for PPC and mortality rates. Results will be scrutinised via forest plots. Subgroup analysis will follow the same Estimand framework as the primary analysis (Table 4).

5.5 Missing data

Consideration will be given to any missing data in the form of a sensitivity analysis to determine the degree to which the conclusions may change with different missing data assumptions.

5.6 Harms

This trial has been classified as a Type A CTIMP as the potential risk is no higher than that of standard care. The secondary endpoints of this trial focusing on patient safety are major post-operative complication rates and survival status. Frequencies of Serious Adverse Events (SAE) will be reported by event type, causality and outcome. Frequencies of symptoms associated with the SAEs will also be reported. No additional adverse event details will be collected.

5.7 Statistical software

Data will be analysed using StataSE (version 18.0 or above).

6 References

1. Harper, N. J., Cook, T. M., Garcez, T., Farmer, L., Floss, K., Marinho, S., . . . McGuire, N. (2018). Anaesthesia, surgery, and life-threatening allergic reactions: epidemiology and clinical features of perioperative anaphylaxis in the 6th National Audit Project (NAP6). *Br J Anaesth, 121*(1), 159-171. doi:10.1016/j.bja.2018.04.014

2. Myles, P. S., Shulman, M. A., Stephane, H., Wallace, S., McIlroy, D. R., McCluskey, S., . . . Forbes, A. (2017). Validation of days at home as an outcome measure after surgery: a prospective cohort study in Australia. *BMJ Open, 7*(8). doi:10.1136/bmjopen-2017-015828.

3. Abbott, T. E., Fowler, A. J., Pelosi, P., Gama de Abreu, M., Moller, A. M., Canet, J., . . . StEP-COMPAC Group. (2018). A systematic review and consensus definitions for standardised end-points in perioperative medicine: pulmonary complications. *Br J Anaesth, 120*(5), 1066-1079. doi:10.1016/j.bja.2018.02.007.
4. Stark, P. A., Myles, P. S., & Burke, J. A. (2013). Development and psychometric evaluation of a postoperative quality of recovery score: the QoR-15. *Anaesthesiology, 118*(6), 1332-40. doi:10.1097/ALN.0b013e318289b84b
5. Hernandez Alava, M., Pudney, S., & Wailoo, A. (2023). Estimating the Relationship Between EQ-5D-5L and EQ-5D-3L; Results from a UK Population Study. *Pharmacoeconomics, 41*(2), 199-207. doi:10.1007/s40273-022-01218-7
6. Cho, Y., Ju, J., Sim, H., Lee, J.-H., Hong, D., Kim, T., . . . Jeon, Y. (2016). Intraoperative anaphylaxis to neuromuscular blocking agents. The incidence over 9 years at two tertiary hospitals in South Korea. A retrospective observational study. *European Journal of Anesthesiology, 33*(5), 368-378. doi:10.1097/EJA.0000000000000373
7. Reddy, J., Cooke, P., van Schalkwyk, J., Hannam, J., Fitzharris, P., & Mitchell, S. (2015). Anaphylaxis is more common with Rocuronium and Succinylcholine than with Atracurium. *Anesthesiology, 122*(1), 39-45. doi:10.1097/ALN.0000000000000512